IN THE SPECIFICATION

Please replace paragraph 0001 with as follows:

This application incorporates herein by reference U.S. application Ser. No. 10/354,797 (Attorney Docket No. Pillar 709) entitled, Methods and Systems of Host Caching, filed on Jan. 29, 2003, now U.S. Patent No. 6,965,979 B2 and U.S. application Ser. No. 10/440,347 (Attorney Docket No. Pillar 713) entitled, Methods and Systems of Cache Memory Management and Snapshot Operations, filed on May 16, 2003.

Please replace paragraph 0024 with as follows:

The first host includes a cache manager 13, a cache directory 15, and cache lines 16. The cache memory 20 is nonvolatile memory or volatile memory or a combination of both. Nonvolatile memory protects data in the event of a power interruption or a host failure. Data is defined as including user data, instructions, and metadata. Nonvolatile memory may be implemented with a battery that supplies power to ~~the~~ a DRAM to make it nonvolatile memory when a conventional external power interrupt circuit detects a power interruption or with inherently nonvolatile semiconductor memory.

Please replace paragraph 0030 with as follows:

As shown in FIG. 1, the first host connects, or couples, to the first data storage subsystem through the bus adapter 22, the interface bus 24, the adapter 26, the link 28, the ~~interconnection~~ interconnect network 30, and the link 32. To connect to the second data storage subsystem, the first host uses the same I/O path except the data passes through link 34, while the second host uses the same type of I/O components plus link 32 to communicate with the first data storage subsystem, or link 34 to communicate with the second data storage subsystem, or link 36 to the data storage subsystem N.

Please replace paragraph 0031 with as follows:

Each storage device in a data storage subsystem is assigned a logical unit number (LUN) that is an identifier for the storage device. A virtual logical unit number (VLUN) is

[as] an abstraction of the storage device(s) or the virtualization of the data storage subsystems such as a linear array of 512-byte data blocks as it appears to the data storage system users. In various embodiments, the implementation of a VLUN may be striped (i.e., spread) over multiple RAID groups for added performance, spread over sections of a RAID group for flexibility, or copied on multiple RAID groups for reliability.

Please replace paragraph 0042 with as follows:

Figure 8 illustrates the data storage system, the target VLUN, the first snapshot, the second snapshot, and the creation of an Nth snapshot. At time N, the source VLUN contains the original data elements represented by A_4, B_1, C_2, D_0, E_0, F_3, G_0, and H_0. This will be referred to as the original data of time N and is the data image preserved by snapshot N. Source data has been requested by multiple applications between the second snapshot and time N and thus is resident in cache lines in the cache memory 20, that is, H_0, A_4, and B_1. At step 1, an Nth log file of the Nth snapshot is created. Log files will contain address pointers that locate the original data elements A_4, B_1, C_2, D_0, E_0, F_3, G_0, and H_0 in the target VLUN after that data has been migrated from the source VLUN. At step 2, an Nth bitmap of the Nth snapshot is created. The string of 0s in the Nth bitmap N indicates that there are no data elements in the target VLUN for the Nth snapshot. ~~As discussed earlier, each 0 bit position represents the absence of the data elements A_1, B_0, C_1, D_0, E_0, F_3, G_0, and H_0, respectively and each 1 in a bit position represents the presence of the data elements A_4, B_1, C_2, D_0, E_0, F_3, G_0, and H_0 in the target VLUN. Again, the meaning of the 1s and 0s can represent respectively the absence and the presence of data in the target VLUN.~~